

White oak group

White oak, *Quercus alba*

Bur oak, *Quercus macrocarpa*

Swamp white oak, *Quercus bicolor*



The **volume of white oak has increased** significantly since 1983 due mainly to an increase in the number of larger trees. The number of saplings and poles has decreased in the last ten years possibly indicating a decreasing trend in sawtimber volume in the future.

Rates of growth and mortality have increased but mortality is still lower than average for all species. Whereas white oaks make up about 4.8% of volume and 3.1% of growth in Wisconsin, they account for only 2.5% of mortality.

White oak is an important timber species, accounting for 3.4% of roundwood production in 2009 and 3.3% of removals in 2012. The density of white oak wood is very high and may make it a valuable species for biomass production.

- [How has the white oak resource changed?](#)
Growing stock volume and diameter class distribution: 1983, 1996, and 2012
- [Where does white oak grow in Wisconsin?](#)
Growing stock volume by region with map
- [How fast is white oak growing?](#)
Average annual net growth by region and year: 1983, 1996, and 2012
- [How healthy is white oak in Wisconsin?](#)
Average annual mortality by year
- [How much white oak do we harvest?](#)
Roundwood production by product and year: 1997, 2003, and 2009
- [How much is white oak selling for?](#)
Prices for cordwood and sawtimber: 2000 to present
- [How much white oak biomass do we have?](#)
Aboveground carbon by region of the state: 2012

“How has the white oak resource changed?”
Growing stock volume and diameter class distribution by year

The [growing stock volume](#) of white oaks in 2012 was approximately 1.0 billion cft or about 4.8% of total statewide volume (Chart 1). Volume has increased 65% since 1983.

Growing stock volume in all size classes has increased since 1983 but especially in larger trees (Chart 2). The volume in small trees (5 to 13 inches) has decreased since 1996 while volume in large trees (over 13 inches) has increased by 36% in the same period.

The number of [seedlings](#) has decreased by 47% and the number of poles has decreased by 36% since 1996 for all species (Chart 3). The number of [saplings](#) and [sawtimber](#), however, has increased.

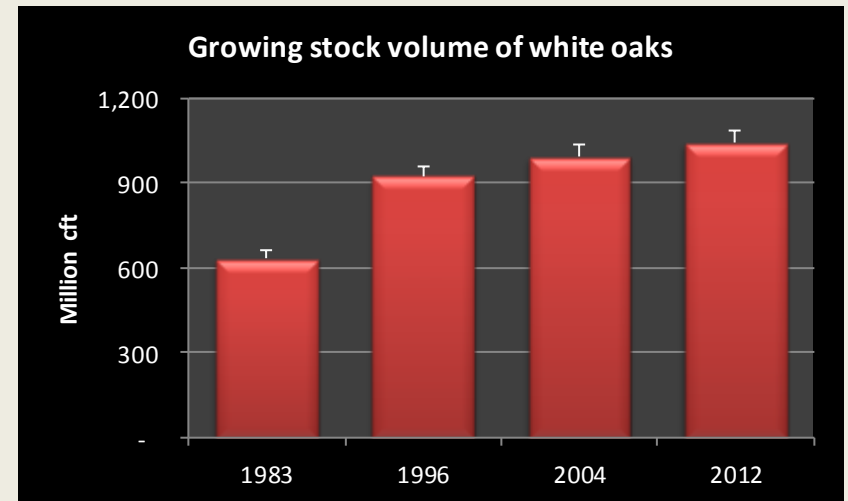


Chart 1. Growing stock volume (million cubic feet) by inventory year.
 Source: USDA Forest Inventory and Analysis data: 1983, 1996, and 2012.

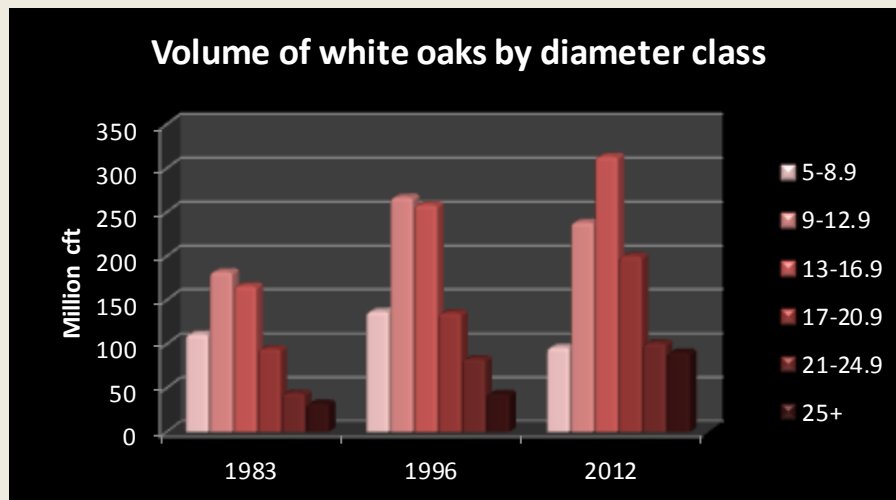


Chart 2. Growing stock volume (million cubic feet) in 1983, 1996, and 2012.
 Source: USDA Forest Inventory and Analysis data: 1983, 1996, and 2012.

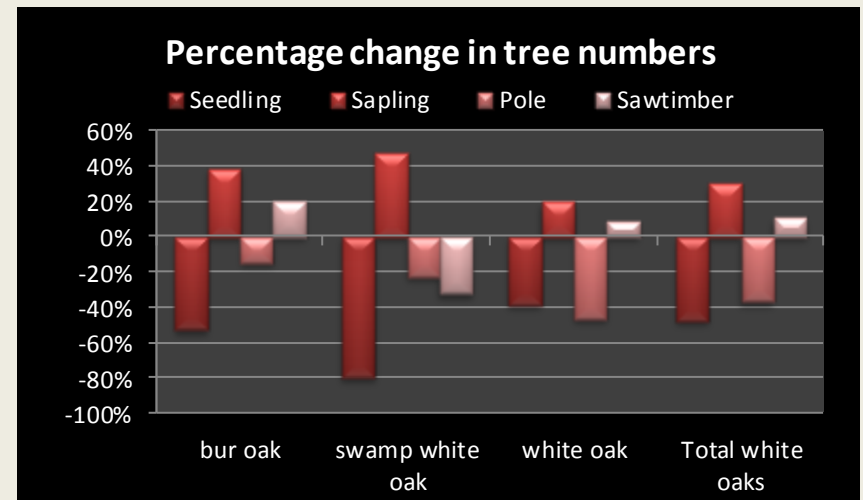
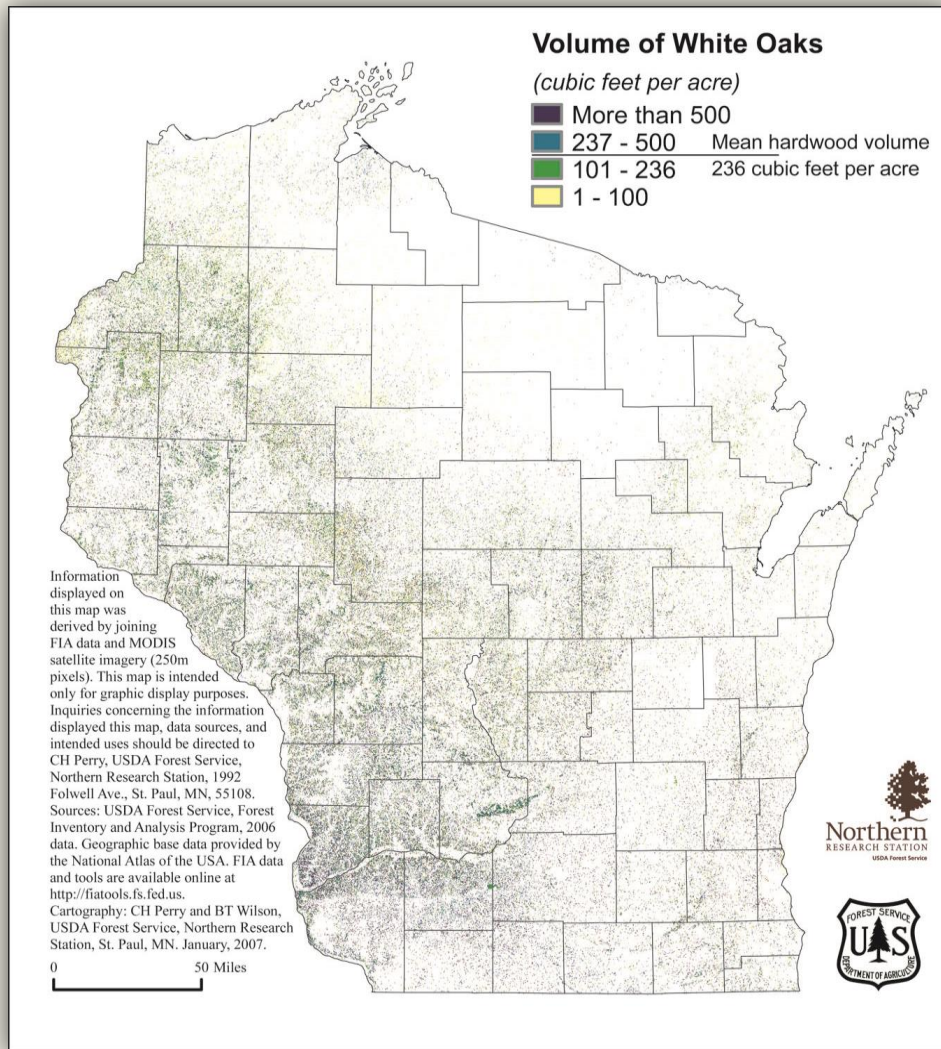


Chart 3. Percentage change in the number of live trees by size class between 1996 and 2012.
 Source: USDA Forest Inventory and Analysis data 1996, and 2012.

"Where do white oaks grow in Wisconsin?"

Growing stock volume by region with map



Two thirds of the white oak group is white oak with bur oak making up most of the remainder (Table 1).

White oaks occur throughout Wisconsin but are much more common in the western and central parts of the state. The northeast has only 3% of all white oak volume. The majority of white oak occurs on the oak hickory [forest type](#).

Table 1. Growing stock volume (million cft) by species and region of the state.

Species	Central	North east	North west	South east	South west	Total	Percent of total
Bur oak	60	8	82	85	90	324	31%
Swamp white oak	10	3	1	5	10	29	3%
White oak	232	11	80	113	251	687	66%
Total white oaks	302	21	163	203	351	1,039	100%
Percent of total	29%	2%	16%	20%	34%	100%	

Source: USDA Forest Service, Forest Inventory and Analysis 2012 data

For a table on **Volume by County for 2012** go to:

<http://dnr.wi.gov/topic/ForestBusinesses/documents/tables/VolumeCountySpecies.pdf>



"How fast are white oaks growing?"
Average annual net growth by region and year

Average annual net growth of white oaks is about 17.6 cft/yr, representing 3.1% of statewide volume growth (Chart 4). Growth rates have increased 53% since 1983 and about 13% since 1996.

Table 2. Average annual net growth (million cft/year) of growing stock and the ratio of growth to volume by region of the state.

Region	Net growth	Percent of Total	Ratio of growth to volume
Central	5.7	32%	1.9%
Northeast	0.6	3%	2.6%
Northwest	2.9	16%	1.8%
Southeast	3.0	17%	1.5%
Southwest	5.4	31%	1.5%
Statewide	17.6	100%	1.7%

Source: USDA Forest Inventory and Analysis 2012

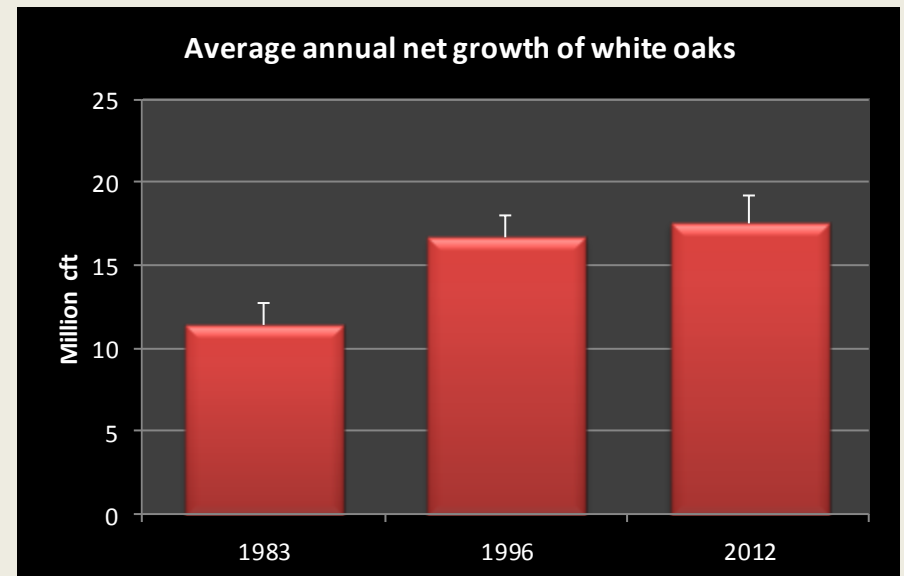


Chart 4. Average annual net growth (million cubic feet).
 Source: USDA Forest Inventory & Analysis data: 1983, 1996, 2012

The average statewide ratio of growth to volume for white oaks is 1.7%, lower than the statewide average of 2.6% for all species (Table 2).

For a table of **Average annual growth, mortality and removals by region** go to:
<http://dnr.wi.gov/topic/ForestBusinesses/documents/tables/GrowthMortalityRemovals.pdf>



"How healthy are white oaks in Wisconsin?"

Average annual mortality by year

Average annual mortality of white oaks, about 6.0 million cft per year in 2012, has almost **tripled since 1996** (Chart 5). White oaks account for 4.8% of total growing stock volume in the state but only 2.5% of total mortality.

The ratio of mortality to gross growth is 25.3% for white oaks, **lower than the statewide average** of 28.8% for all species (Table 3).

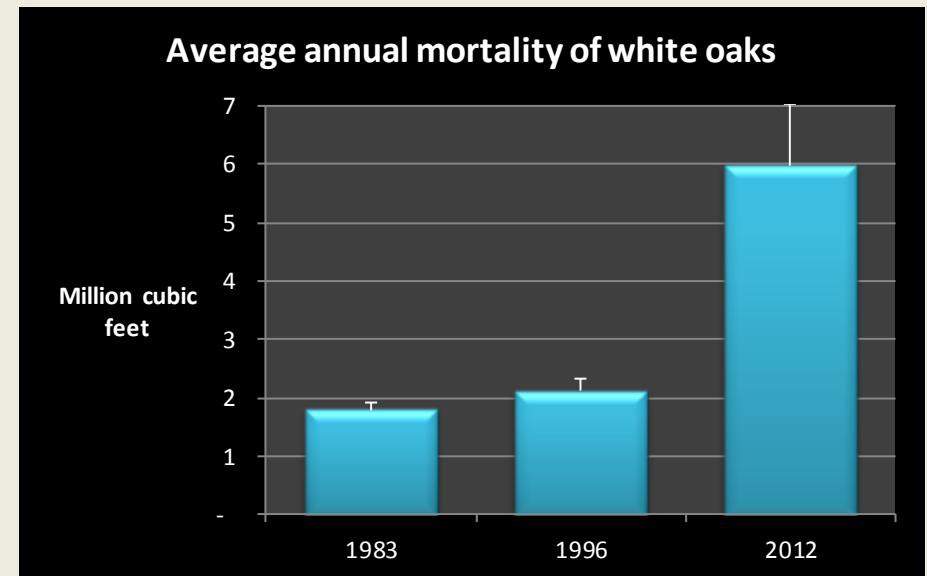


Chart 5. Average annual mortality (million cubic feet) by inventory year.
Source: USDA Forest Inventory & Analysis data: 1983, 1996, and 2012

Table 3. Mortality, gross growth and the ratio of mortality to gross growth.

Species	Average annual mortality (cft)	Average annual gross growth (cft)	Mortality / growth
Bur oak	2,076,809	7,184,052	28.9%
Swamp white oak	75,842	824,426	9.2%
White oak	3,812,218	15,511,124	24.6%
Total white oaks	5,964,868	23,556,046	25.3%

Source: USDA Forest Inventory & Analysis data: 2012

For a table of **Average annual growth, mortality and removals by region** go to:
<http://dnr.wi.gov/topic/ForestBusinesses/documents/tables/GrowthMortalityRemovals.pdf>



"How much white oak do we harvest?"

Roundwood production and removals by product and year

In 2003, white oak accounted for 12.2 million cft or 3.4% of Wisconsin's total [roundwood](#), a decrease of 2% since 2003. About 60% is in fuelwood and 30% in veneer and sawlogs (Chart 6).

From 2003 to 2009, pulpwood production decreased by 52% while fuelwood production more than doubled. White oak supplies less than 1% of pulpwood but over 8% of fuelwood.

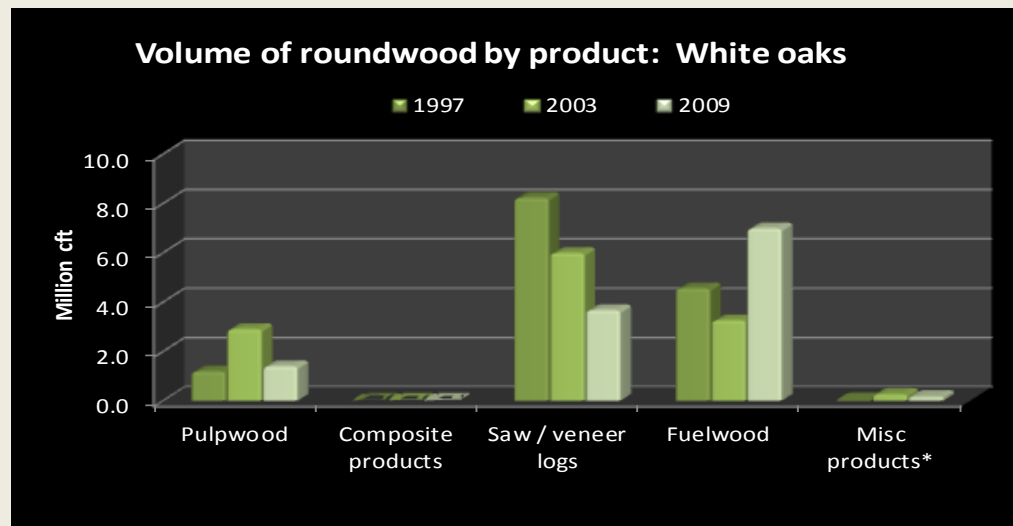


Chart 6. Volume of roundwood products. * Miscellaneous products include poles, posts, and pilings.
Source: Ronald Piva, USDA Forest Service, Northern Research Station, St. Paul MN

The ratio of removals to net growth is 57% for white oaks, slightly higher than the statewide average ratio of 53.4% (Chart 7). The ratio of removals to growth has fallen 52% from 1996. Between 1996 and 2008-2012, white oak removals decreased by 31% while growth increased 13% in the same time period.

Removals were 10 million cft in 2008-2012 of which 79% was white oak.

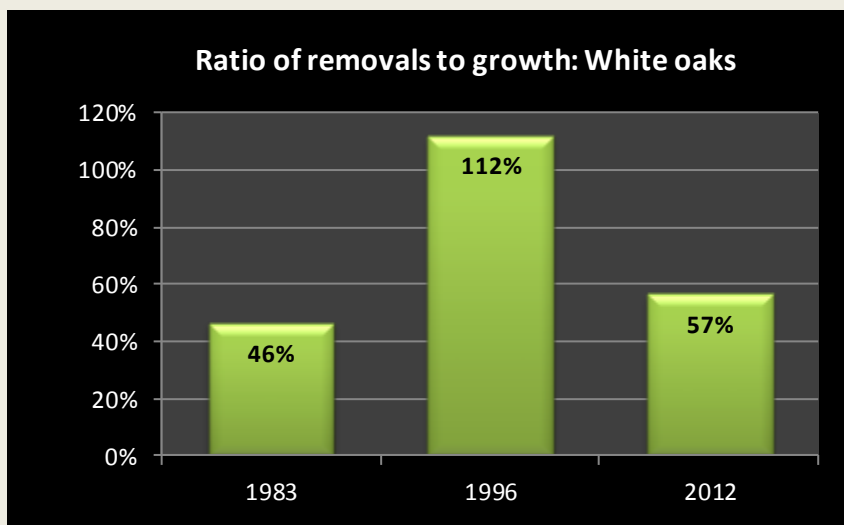


Chart 7. Ratio of volume harvested annually to net growth.
Source: USDA Forest Inventory & Analysis data: 1983, 1996, and 2012.

For a table of **Average annual growth, mortality and removals by region** go to:

<http://dnr.wi.gov/topic/ForestBusinesses/documents/tables/GrowthMortalityRemovals.pdf>



"How much is white oak selling for?"

Prices for pulpwood & sawtimber: 2000 to present

Due to the variability of timber prices from year to year and region to region, two methods of reporting prices are presented here: [Timber Mart North](#) and [weighted average stumpage prices](#) from Wisconsin Administrative Code Chapter NR 46.

Stumpage prices for sawtimber, as reported in the Timber Mart North (Chart 8), have decreased since 2000.

Average weighted stumpage values for both cordwood and logs (Table 4) peaked in 2004-2006 and have decreased since. White oak logs are currently higher than average.

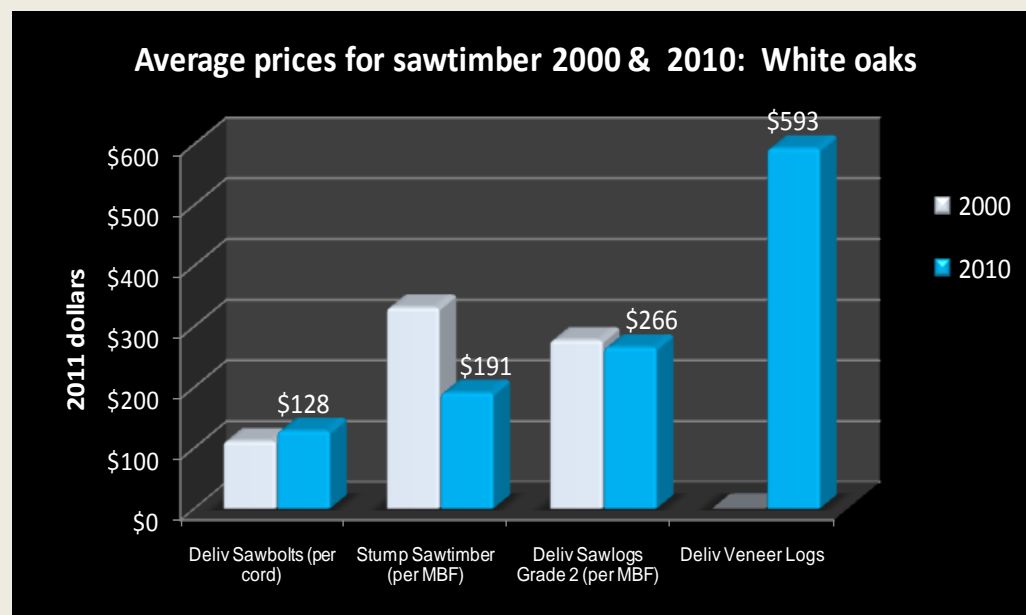


Chart 8. Average prices for cordwood and sawtimber (2008).

Source: Timber Mart North, George Banzhaf & Company, 8301 N. Allen Lane, Milwaukee, WI 53217

Table 4. Average weighted stumpage prices (adjusted for inflation to 2012 dollars per MBF) by year for Wisconsin.

Product	2002	2003	2004	2005	2006	2007	2008	2009	2010	2012	Average for all hardwoods
Cordwood (per cord)	NA	\$18	\$24	\$16	\$22	\$18	NA	\$15	\$13	\$18	\$19
Logs (per MBF)	\$232	\$211	\$216	\$212	\$194	\$158	\$170	\$125	\$126	\$176	\$148

Source: Wisconsin Administrative Code Chapter NR46, 2002 to 2012. The stumpage values calculated each year are for the sole purpose of assessing MFL yield and FCL severance taxes, not for determining the price that should be received for timber.



"How much white oak biomass do we have?"

Aboveground carbon by region of the state

There were 39.9 million tons of aboveground [biomass](#) in live trees of the white oak group in 2012, an increase of 50% from 1983. This is equivalent to approximately 19.7 million tons of carbon and represents 6.4% of all aboveground biomass statewide. As with volume, most white oak biomass is located in southwest and central Wisconsin (Chart 9).

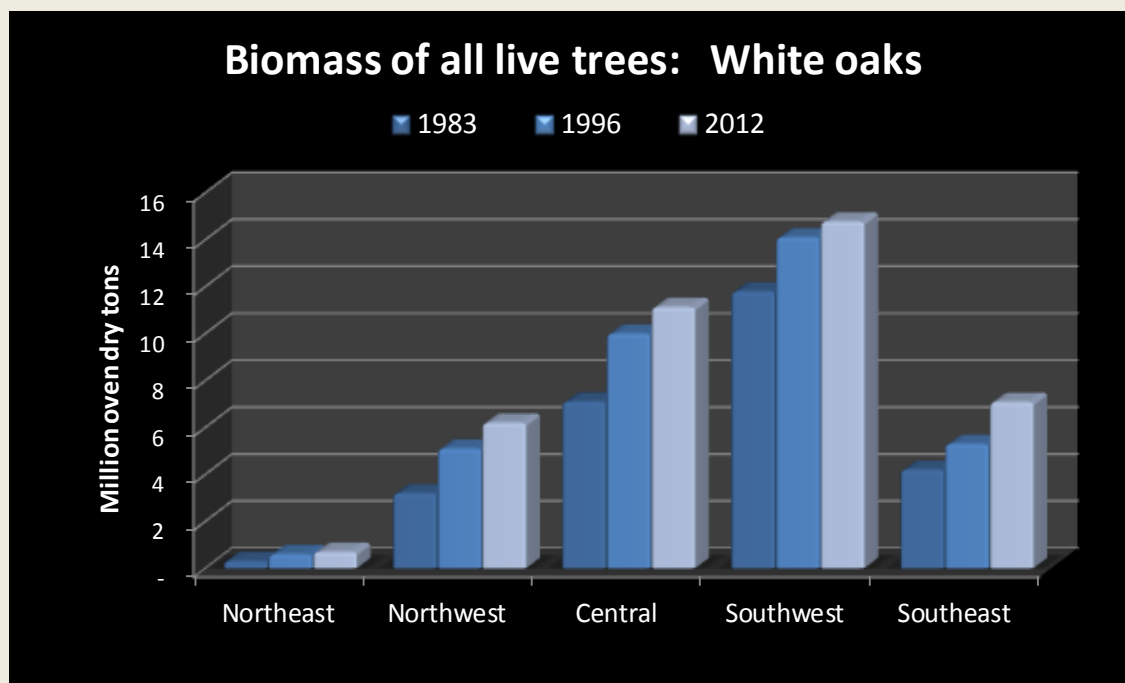


Chart 9. Biomass (above ground dry weight of live trees >1 in dbh, short tons) by year and region of the state.
Source: USDA Forest Inventory & Analysis data: 1983, 1996, and 2012

The density of white oak wood is much higher than average with a ratio of biomass to volume of 58.8 oven-dry lbs. per cubic foot, second only to red oak. The average for all hardwoods is about 50.1 ODP/cft and for all species is 46.8 ODP/cft.

Approximately, 78% of all white oak biomass is located in the main stem and 18% in the branches.

For a table of **Biomass by County for 2012** go to:

<http://dnr.wi.gov/topic/ForestBusinesses/documents/tables/BiomassByCounty.pdf>